REMARKS

Claim 10 is amended. Claim 2 is cancelled. Claims 3, 5-6, 8-10 and 31-32 are pending in the application.

Claims 2-3, 5-6, 8, 10 and 31-32 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Lee, U.S. Patent No. 5,923,056; as combined with Vossen and Kern, "Thin Film Processes II" pp. 80-81, 108-110, 113-115, 188 and 200 (1991); and Japan Patent 60-167352 (Fujisada). As set forth in MPEP § 2143, a proper obviousness rejection has the following three requirements: 1) there must be some suggestion or motivation to modify or combine reference teachings; 2) there must be a reasonable expectation of success; and 3) the combined references must teach or suggest all of the claim limitations. Claims 3, 5-6, 8, 10 and 31-32 are allowable over Lee as combined with Vossen and Kern, and Fujisada for at least the reason that the references fail to disclose or suggest each and every limitation in any of those claims.

As amended, independent claim 10 recites evaporating aluminum oxide from a single crystal sapphire, evaporating silicon monoxide from a silicon monoxide source, forming a vapor mixture, and depositing at least some of the silicon and aluminum oxide on a semiconductive material substrate to form a layer of Al_2O_3 doped with silicon atoms, where some of the oxygen present in the Al_2O_3 is contributed by the silicon monoxide. Claim 10 further recites that the amount of silicon present in the silicon doped aluminum oxide is controlled by controlling the evaporation rate of silicon monoxide, and that O_2 is precluded from flowing into the chamber during the evaporating aluminum oxide, during evaporating silicon monoxide, during the forming a vapor mixture and during the depositing. The amendment to claim 10 incorporates the subject matter of former claim 2.

Claim 2 is appropriately cancelled. The amendment is further supported by the specification at, for example, page 8, line 21 through page 9, line 4 and page 10, lines 6-9.

Lee discloses formation of a silicon doped thin film by sputtering from an aluminum target which contains 1% silicon in an argon-oxygen atmosphere (col. 5, ll. 59-63). Lee does not disclose or suggest the claim 10 recited evaporating aluminum oxide from a single crystal sapphire, evaporating silicon monoxide from a silicon monoxide source and forming a layer of Al_2O_3 doped with silicon atoms from the silicon monoxide, where some of the oxygen present in the Al_2O_3 is contributed by the silicon monoxide. Further, Lee does not disclose or suggest the claim 10 recited precluding O_2 from flowing during the evaporating and during the depositing or the recited controlling the amount of Si dopant in the layer by controlling the evaporation rate of the silicon monoxide.

Vossen and Kern teaches formation of films disclosed in Table 2 utilizing two-source evaporation. Within Table 2 Vossen and Kern disclose forming a high resistivity Cr-SiO film utilizing a Cr source and a SiO source (pg. 108). In an independent table (Table 3) Vossen and Kern discloses particular vapor species formed by evaporation of particular compounds including Al_2O_3 (at pg. 113) and SiO (at pg. 114). The Examiner indicates at pages 3-4 of the present Action that it would be obvious to use a silicon monoxide source and an aluminum oxide source to form a silicon-doped aluminum oxide because SiO and Al_2O_3 sources are well known and will result in the same silicon-doped aluminum oxide as that disclosed in Lee. As indicated in applicant's previous response, this statement is conclusory.

At pages 7-8 of the Action, the Examiner states that the disclosure of Vossen and Kern expressly indicates "that when two or more components are simultaneously

evaporated they will result in a composite film of the components". The Examiner indicates reliance upon Vossen and Kern's example where SiO is used as one component and Cr or Au as the other component to produce either Cr-SiO or Au-SiO films. Applicant notes that the recitation in claim 10 is directed toward a layer of Al_2O_3 which is doped with silicon atoms and such does not recite a composite of the two source materials. Accordingly, the Examiner's theory goes directly against formation of the recited Al_2O_3 doped with silicon atoms and in fact supports a finding of unexpected results. Accordingly, as combined with Lee, the Vossen and Kern disclosure of composite layers comprising SiO does not contribute toward suggesting the claim 10 recited layer of Al_2O_3 doped with silicon atoms formed from evaporating aluminum oxide from a single crystal sapphire and evaporating silicon monoxide from a source comprising silicon monoxide. Nor does the Vossen and Kern disclosure contribute toward suggesting the recited amount of silicon dopant present in the aluminum oxide being controlled by controlling the evaporating rate during the evaporating silicon monoxide.

In addition to the above, nothing in the disclosures of Vossen and Kern and Lee disclose or suggest the claim 10 recited oxygen present in the Al_2O_3 being contributed by the silicon monoxide. The Examiner indicates at page 5 of the present action that the omission of O_2 would be obvious since oxygen component is already provided in the SiO and Al_2O_3 sources. However, nothing in the references of record teaches or suggests oxygen present in the Al_2O_3 being contributed by silicon monoxide evaporated from the silicon monoxide source. Accordingly, this ground of rejection is unsupported by the cited references.

As indicated at pages 4-5 of the present Action, Fujisada is relied upon as showing

benefits of utilizing a sapphire target. However, as combined with Lee and Vossen and Kern, the sapphire target disclosed by Fujisada does not contribute toward suggesting the layer of Al_2O_3 doped with silicon atoms formed by evaporating aluminum oxide from a single crystal sapphire and evaporating silicon monoxide from a silicon monoxide source where silicon atoms from the silicon monoxide are present as dopant within the aluminum oxide layer and where oxygen present in the aluminum oxide is contributed by the silicon monoxide. Accordingly, independent claim 10 is not rendered obvious by the cited combination of Lee, Vossen and Kern, and Fujisada and is allowable over these references.

Dependent claims 3, 5-6, 8 and 31-32 are allowable over the cited combination of Lee, Fujisada and Vossen and Kern for at least the reason that they depend from allowable base claim 10.

Claim 9 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Lee in view of Vossen and Kern and Fujisada as further combined with Wolf "Silicon Processing for the VLSI Era", page 5. As indicated at page 7 of the present Action, Wolf is relied upon as teaching monocrystalline or "single crystal" silicon substrates. However, as combined with Lee, Vossen and Kern, and Fujisada, the Wolf disclosure of a monocrystalline substrate does not contribute toward suggesting the claim 10 recited forming a layer of Al_2O_3 doped with silicon atoms from evaporating aluminum oxide from a single crystal sapphire and evaporating silicon monoxide from a source comprising silicon monoxide where the amount of silicon present and the silicon doped aluminum oxide is controlled by controlling the evaporation rate during evaporating silicon monoxide. Nor does Wolf contribute toward suggesting the recited precluding O_2 from flowing during evaporating

during forming a vapor mixture and during depositing. Accordingly, independent claim 10 is not rendered obvious by the cited combination of Lee, Vossen and Kern, Fujisada and Wolf and is allowable over these references. Claim 9 is allowable over Lee, Vossen and Kern, Fujisada and Wolf for at least the reason that it depends from allowable base claim 10.

For the reasons discussed above, claims 3, 5-6, 8-10 and 31-32 are allowable. Accordingly, applicant respectfully requests formal allowance of such pending claims in the Examiner's next action.

Respectfully submitted,

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